



B.Tech III Semester Regular/Supplementary Examinations, February 2021

Metallurgy and Material Science
(Mechanical Engineering)

Maximum Marks: 70

Date: 22.02.2021 Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

1. Mention the Purpose of alloying.
2. What is grain boundary?
3. Give the Gibbs phase rule and specify the terms.
4. What is a peritectic system?
5. Compare annealing and hardening.
6. What is an isothermal transformation diagram?
7. What is duralumin? Write its applications.
8. Discuss if cast iron is stronger than steel.
9. Classify composites based on the type of reinforcements.
10. What is polymerization? Mention its types.

Part-B

Answer All the following questions.

(10MX 5=50Marks)

11. What is packing efficiency? Derive the atomic packing factor for hexagonal, BCC and FCC lattice with necessary diagrams. (10M)

(OR)

12. Explain the various types of solid solutions with neat sketches. (10M)
13. Discuss the construction of binary (Cu-Ni) phase diagram, with proper reference to salient points. (10M)

(OR)

14. Explain the phase diagram of a Eutectic system with an example. (10M)
15. Draw the iron-iron carbide phase diagram and discuss the phase transformations. (10M)

(OR)

16. Discuss the importance of heat treatment. Explain the important methods of heat treatment of steels. (10M)

17. Give an account of the composition, properties and applications of any two types of cast iron. (10M)

(OR)

18. Discuss the various steps involved in fabrication of a part using the technique of powder metallurgy. (10M)

19. Write short notes on the following: (10M)

(a) Thermosets and thermoplasts

(b) Properties of nano materials and their engineering applications.

(OR)

20. Write short notes on the following: (10M)

(a) Composition and characteristics of a few common glasses.

(b) Properties and application of composites.